friendship with him during the few short years of life that were left to him.

Gadolin was the most distinguished of Bergman's pupils. Under him he began the metallurgical and mineralogical inquiries with which his name is associated. At Upsala, too, he commenced his work on specific heat, which he subsequently published at Åbo in 1784. On the death of Bergman, he was a candidate for the chair at Upsala, but Afzelius was chosen, whereupon Gadolin returned to Finland, and in 1785 was made professor extraordinarius at the University of Åbo. The duties of his office left him, however, ample leisure, part of which he occupied in travel in Germany, Holland, and England. He established a literary connection with Lorenz Crell, which led to frequent communications to the *Annalen* which Crell edited. Whilst in London he published a memoir on the analysis of iron ores by wet methods, in which he gave the first suggestion of a method of volumetric analysis, and in conjunction with Crawford he undertook a series of determinations of the latent and specific heat of ice. Passing over to Ireland, he made the acquaintance of Kirwan, with whom he subsequently corresponded on mineralogical matters.

Gadolin was early attracted to the work of the French School of Chemistry, and made known the new doctrine to northern Europe. On his return to Åbo in 1789 he adopted the new chemistry as a feature of his teaching. In 1797, on Gadd's death, he became ordinary professor of chemistry, holding the chair until 1822, when he retired. Phlogistonism died hard in Sweden, but Gadolin's handbook, which he published in the Swedish language in 1798, did much to kill it. The most fruitful period of Gadolin's scientific activity is comprised between the years 1788 and 1803.

It was Gadolin who first made known the existence of a new earth in a black mineral from Ytterby, in Sweden, which Ekeberg subsequently termed *Yttria-earth,* the first discovered member of that numerous group of bodies we term the rare earths. The mineral itself became known as Gadolinite. A hundred years later Marignac and Lecoq de Boisbaudran found a new element in Samarskite, which they named *Gadolinium,* in honour of the discoverer of the first of this series of substances.

The great fire of 1827, which practically destroyed Åbo, and with it the university buildings and the whole of his mineral collections, terminated Gadolin's scientific career. The site of the university was moved to Helsingfors, and Gadolin retired to the country, where he died on August 15, 1852, at the age of ninety-two.

In the handsome quarto volume before us Prof. Hjelt and his collaborator have put together a very complete account of Gadolin's career and of his services to science. This is followed by copious extracts from his correspondence, some details of his courses of university lectures, and a selection of his more important memoirs, and the whole concludes with a list of his contemporaries, more particularly of those associated with him as academic colleagues, co-workers in science, or as literary correspondents. The chapter on Gadolin's scientific activity contains an admirable critical account of his relation to his period and of the part he played in connection with the downfall of phlogistonism. It also contains a full and discriminating analysis of his more important memoirs, viz., on specific heat, on iron analysis, and on his detection of the first member of the series of rare earths. The short acount of his system of teaching is largely made up of extracts from the manuscripts of his lectures. They are especially rich in historical references and throw interesting sidelights on his period.

T. E. T.

NOTES.

We notice with deep regret the announcement of the death, in his fifty-ninth year, of Prof. J. H. van 't Hoff, honorary professor of general chemistry in the University of Berlin, on February 1, at Steglitz, near Berlin.

The nineteenth "James Forrest" lecture of the Institution of Civil Engineers will be delivered on Wednesday, June 28, by Dr. F. H. Hatch, his subject being "The Past, Present, and Future of Mining in the Transvaal."

The president of the Royal Society and the members of the General Board of the National Physical Laboratory will meet at the laboratory on Friday, March 17, for the annual visitation, when the various departments will be on view.

Prof. H. E. Armstrong, F.R.S., has been nominated the delegate of the Royal Institution at the celebration of the centenary of the Royal Frederick University of Christiania, and Sir James Crichton-Browne, F.R.S., as delegate at the celebration of the 500th anniversary of the University of St. Andrews.

Lieut.-Colonel David Prain, F.R.S., director of the Royal Botanic Gardens, Kew, has been elected a member of the Athenæum Club under the provisions of the rule which empowers the annual election by the committee of a certain number of persons "of distinguished eminence in science, literature, the arts, or for public services."

It is announced in the *Revue scientifique* that M. Fauvel has offered 30,000 francs for the construction of an annexe to the laboratory of the National Museum of Natural History in Paris.

The death is announced, at sixty-eight years of age, of Mr. John Sime, C.I.E., late Director of Public Instruction in the Punjab and Under-Secretary to the Punjab Government in the Education Department.

We regret to notice that Mr. E. E. Wilson, formerly an assistant in the radiography department of the London Hospital, died on March 2 as the result of disease contracted by frequent exposure to Röntgen rays.

The Easter excursion of the Geologists' Association will be to St. David's district, South Wales, and will extend from April 13 to April 22. The excursion directors are Mr. J. F. N. Green and Prof. O. T. Jones, and the excursion secretary Mr. A. L. Leach, Giltar, Shrewsbury Lane, Plumstead, S.E.

A conference of members of the Museums Association and others interested in museums will be held at Belle Vue and Bankfield Museums on Saturday, April 8, for the purpose of discussing subjects of interest to those concerned in the work of museums, art galleries, and kindred institutions. Anyone proposing to attend the conference should communicate with Mr. H. Ling Roth, Briarfield, Shibden, Halifax.

Dr. John W. Harshberger, assistant professor of botany in the University of Pennsylvania, has just returned from an expedition in the Everglades of southern Florida, during which he collected several plants previously unknown to science. The Everglades themselves, he reports, are fast passing away through continual drainage, and their vegetation is likely soon to become extinct.

We learn from *Science* that the U.S. Senate has passed the Weeks Bill providing for the establishment of a forest reserve in the Appalachian Mountains. The Bill is applicable from Maine to the Gulf of Mexico, on the eastern seaboard. The Bill gives the consent of Congress to the States to enter into an agreement among themselves for the purpose of conserving the forests and water supply of each, and grants 40,000*l.* to enable the Secretary of Agriculture to cooperate with such States in giving fire protection. In addition, the Bill appropriates 200,000*l.* for one year, and not more than 400,000*l.* for each year thereafter, until 1915, for surveys, examinations, and acquirement of lands located at the headwaters of streams which are being or may be developed for navigable purposes.

A FLIGHT from Paris to the crest of the Puy de Dôme was accomplished by M. Eugène Renaux on a Maurice Farman biplane with a passenger on March 7. The distance is 210 miles, and the journey was made to the crest of the Puy de Dôme, 4000 feet high, in 5h. 11m., after one landing. This is the fourth noteworthy aëroplane flight of the present year, the others being:—January 30, Mr. McCurdy, the Canadian aviator, flew over-sea from Key West (Florida) to within ten miles of Havana, in the island of Cuba; February 1 and February 2, Captain Bellanger flew from Paris to Pau, *via* Bordeaux, a distance of nearly 500 miles; March 5, Lieut. Bague flew 140 miles over-sea from Nice almost to the Italian coast. Referring to these flights, *The Morning Post* says:—"These flying achievements, viewed in regard to the lengthy periods over which they were sustained, the precision with which they were executed, and the fact that in each case the aviator had a definite goal which he succeeded—or all but succeeded—in reaching, place the art of aviation in a position, as concerns its practical usefulness, which it would have been all but impossible to have foreseen only a year ago."

THE following are among the lecture arrangements at the Royal Institution after Easter:—Prof. F. W. Mott, two lectures on the brain and the hand; Prof. W. W. Watts, two lectures on (1) the ancient volcano of Charnwood Forest (Leicestershire), (2) Charnwood Forest and its fossil landscape; Prof. R. W. Wood, three lectures on the optical properties of metallic vapours; Dr. W. N. Shaw, two lectures on air and the flying machine: (1) the structure of the atmosphere and the texture of air currents, (2) conditions of safety for floaters and fliers; Mr. T. Thorne-Baker, two lectures on (1) changes effected by light, (2) practical progress in wireless telegraphy; Mr. W. P. Pycraft, two lectures on phases of bird life: (1) flight, (2) migration. The Friday evening meetings will be resumed on April 28, when a discourse will be given by Prof. W. M. Flinders Petrie on the revolutions of civilisation. Succeeding discourses will probably be given by Prof. Martin O. Forster, Prof. W. Stirling, Prof. R. W. Wood, Prof. Gilbert Murray, Commendatore G. Marconi, and Prof. Svante Arrhenius, among others.

THE first Universal Races Congress will be held on July 26–29 in the central building of the University of London. The object of the congress will be to discuss, in the light of modern knowledge and the modern conscience, the general relations subsisting between the peoples of the West and those of the East, between so-called white and so-called coloured peoples, with the view of encouraging between them a fuller understanding, the most friendly feelings, and a heartier cooperation. The following is the programme for the eight half-day sessions:—(1) fundamental considerations—meaning of race, tribe, nation; (2–3) general conditions of progress; (3*a*) peaceful contact between civilisations; (4) special problems in inter-racial economics; (5–6) the modern conscience in relation to racial questions; (7–8) positive suggestions for promoting inter-racial friendliness. It is proposed to hold in connection with the congress an exhibition of books, documents, photographs of the highest human types, skulls, charts, &c. The exhibition is under the direction of Dr. A. C. Haddon, F.R.S., and promises to be of wide interest. A prospectus will be sent free of charge on application to the honorary secretary of the congress, Mr. G. Spiller, 63 South Hill Park, Hampstead, London.

MR. L. PEARSALL SMITH writes to *The Times* to suggest that another term, such as "halcyon"—used as a substitute—should be adopted in the place of "anti-cyclone," as this word is said not to convey the connotation of calm and pleasant weather conditions. "While popular speech," he remarks, "has been able to adopt 'cyclone,' it has found, as we might expect from its form, 'anti-cyclone' unsuited for its purpose." The unfortunate thing is that popular speech, as expressed in the daily Press, calls a storm or any unusual atmospheric disturbance a cyclone, whereas it is nothing of the kind. What Mr. Smith proposes, therefore, is that the exact terms of meteorological science shall be modified to adapt them to the indefinite and often incorrect expressions of popular language. For the sake of the preservation of precision in scientific nomenclature, it is worth while to give in this connection a quotation from a publication of the U.S. Weather Bureau, issued many years ago:—"The terms 'cyclone' and 'anti-cyclone' do not describe phenomena that can be observed by one observer at a single station; they should, therefore, not be used in the description of local phenomena; they represent generalisations based upon the charting and study of winds and clouds observed at many stations, and should only be used when the nature of the rotation of the wind has been clearly demonstrated or can be safely inferred."

A SUMMARY of the temperature, rainfall, and bright sunshine in the United Kingdom for the past winter is given by the Meteorological Office in its last issue of the Weekly Weather Report. The mean temperature was slightly in excess of the average over the entire kingdom, but the difference was nowhere large. At Greenwich the mean for the three winter months, December to February, was 1·7° below the normal, but December is the only month where the departure from the average was considerable, amounting to an excess of 5°. The Midland counties is the only district in which the sheltered thermometer touched 60°, whilst the minima in the several districts fell below 20° everywhere except in the Channel Islands. The aggregate winter rainfall was deficient except in the north and west of Scotland and in the east and north-west of England. The greatest deficiency is 2·64 inches in the south of Ireland, and 2·22 inches in the Channel Islands. The largest aggregate rainfall for the three months is 17·37 inches in the north of Scotland, and the least 4·30 inches in the north-east of England. There was an excess of rain during the winter at Greenwich, due entirely to the heavy rains in December. The rainy days were in fair agreement with the average, the maximum number being 73 in the north of Scotland, and the minimum 46 in the north-east of England. The duration of bright sunshine was generally in fair agreement with the average over the whole kingdom, the records for England showing a slight excess. The maximum duration of sunshine is 209 hours in the Channel Islands, the minimum 103 in the north of Scotland.

WE learn from the Wellington (N.Z.) *Evening Post* of December 7, 1910, that the New Zealand Government has voted 50*l.* or 100*l.* towards the cost of explosives for rain-making experiments to be made at Oamaru and adjacent drought-stricken parts. It has been shown that such experiments are a useless expenditure of money, and (as stated in the article) have been condemned by the best meteorologists of Europe and America. *Symons's Meteorological Magazine* (July–September, 1908) contains a careful report by Mr. D. C. Bates, who was ordered to watch and report upon rain-making experiments previously carried out in the same district. He states that "the explosions had apparently no more effect on the vast expanse of the air than would the striking of a match in a room." In a lecture printed in *Popular Science Monthly* for January last, Prof. C. Abbe, one of our leading authorities on meteorology, states, in connection with laboratory experiments on the formation of clouds and rain:—"I think you will see that the firing of cannon or dynamite in order to make a great noise is not likely to form rain, and, in fact, cannot possibly bring it down." And further, with reference to the cannon used in Italy to send vortex rings of air into the clouds, he says:—"We have no evidence that they ever reach them, or that they could have any effect if they did so. . . . I regret to think of so many thousands of farmers wasting time and money on this delusion"; and with these opinions we entirely concur. The situation was saved in the present instance by rain having fallen before the explosions took place.

THE thirty-third annual general meeting of the Institute of Chemistry was held on March 1. Dr. George Beilby, F.R.S., the president, occupied the chair, and delivered an address, in which, after referring to the losses of the institute by death, mentioning especially Prof. Campbell Brown, Mr. Michael Carteighe, and Mr. Oscar Guttman, he dealt with the progress and work of the institute. The membership continues steadily to increase, notwithstanding the high standard of the examinations, while the position of the institute as an organisation existing for public service never stood so high as at the present time. The council has under consideration the institution of a series of lectures, the object of which will be to bridge over the gap between academic training and practice. Without depreciating the value of a broad scientific education, it is realised that students entirely trained in an academic atmosphere miss some of the advantages of the old system of private pupilage in the laboratories of practising fellows or in works. This loss is met in some instances by students preparing for the final examination in such laboratories, but there is a need for a means of introducing something analogous to the clinical instruction afforded to medical students. It is proposed, therefore, to ask fellows having expert knowledge to give lectures which will give students an insight into the actual work of the chemist, whether engaged in the application of his science to commerce and industry or to the scientific control of the affairs of daily life. Prof. R. Meldola, in moving a vote of thanks to the president for his address, said it would give him much pleasure to see the institute take an active part in the education of chemists, and he cordially supported the new departure as to the institution of the proposed lectures, which will make the student realise more fully the value of the practical side of his subject.

IN *The Times* of March 4 there appeared a further article upon the subject of the spread of plague. Dealing, first, with the disease amongst rodents in East Anglia, the writer refers to the rat investigation recently carried out at Ipswich under the auspices of the Local Government Board. This inquiry lasted for about six weeks, during the course of which about 6000 animals were examined. These rats were not drawn from the area already known to be infected, but from a fairly extensive tract of country on its outskirts. No report has yet appeared, but it is believed that few, if any, plague-rats were found. This result, although apparently reassuring, does not affect the main question. The investigation was carried out during the off-plague season, and at the time when fewest rat-fleas are found. Similar inquiries carried out in India and elsewhere show that it is dangerous to conclude that plague has disappeared from an infected area because no plague-rats are found. It is thereafter desirable that the investigations should be repeated in autumn, and at intervals during the next two or three years. In the meantime, the campaign of rat extermination should be prosecuted with undiminished vigour. Reference is made to the proposal of the War Office to hold extensive manœuvres in Essex. While the possibility of infection among the troops must be considered remote, yet it cannot be said that the establishment of large standing camps is altogether free from risk. Turning next to the question of plague manifestations in other parts of the world, the writer of the article gives some important particulars concerning the occurrence of the pneumonic form of the disease during recent years. These show that a relatively large proportion of such cases occur in temperate climates. Very little is at present known about pneumonic plague, and there are often difficulties in its diagnosis. It is not unlikely that much valuable information may be obtained by a study of the present outburst in Manchuria. No explanation can be afforded for the mysterious disappearance of plague at the beginning of the eighteenth century, or for its equally mysterious reawakening in the Chinese province of Yunnan in the 'seventies of last century. Since the year 1896 it has caused a terrible loss of life in India, and spasmodic cases have occurred in every continent. It has been argued that the Manchurian outbreak suggests an increasing intensity in the violence of plague infection, the consequences of which will presently be universally manifest. Whether or not this be the case, there is ample justification for the statement that the outlook is not hopeful in places where the rodents are infected. Where infection exists there is always danger. Panic would be unwise, but no one acquainted with the history of plague can regard the present situation with indifference.

DR. J. MAES contributes to the February number of *Man* an account of certain remarkable fetish images of the Wazimba tribe, which have recently been acquired by the Congo Museum at Terveuren. Those illustrated are rude male and female figures, one of which guards children, a second watches young girls and presides over accouchements, a third guards the house, and a fourth protects people from nightmare. The treatment consists in making the patient, to the accompaniment of magical formulæ, drink an infusion of manioc leaves, which are first laid on the head of the fetish.

IN *Man* for February Mr. M. W. H. Beach describes, largely from hearsay, the strange Punan tribe in Borneo, a people well deserving further study. They are said to wear bark clothing, to have no houses or property, and to wander about the forest and sleep in trees. Intercourse with them is carried on by the methods of silent barter. They have the curious habit of leaping three or four yards at a time instead of walking, and their speed is marvellous. They kill game with the *sumpitan*, or blow-pipe, not by the usual method of blowing into the mouth, but by striking the end which contains the dart with the curved palms of their hands.

THE Journal of the Royal Society of Arts for February 10 contains a report of a lecture, by Capt. A. J. N. Tremearne, on the Kagoro, a naked, head-hunting West African tribe occupying a mountain ridge running from the Bauchi into the Nassarawa province of northern Nigeria. They are notorious head-hunters, and there is a curious analogy between the objects and methods of the practice among them and the Nagas of Assam. Among both races it is a mark of social evolution, a young man showing his fitness for marriage by producing a head. Further than this, it appears, as in the case of the Meriah sacrifice of the Khonds or Kandhs, to be a means of promoting the fertility of the soil, a fowl in Nigeria being now the surrogate of the human victim which was not long since sacrificed by the Indian tribes.

Parts v. and vi. of the Treasury of Human Inheritance (London: Dulau and Co., Ltd., 1911), issued by the Galton Laboratory for National Eugenics, consists of a monograph on the subject of hæmophilia, by Drs. W. Bullock and Paul Fildes. The authors are to be congratulated on the very thorough manner in which they have performed a task the magnitude of which can be realised when it is stated that the literature list contains full references to and descriptions of 949 separate works. Two hundred and thirty-five pedigrees are diagrammatically represented, and such available clinical notes are provided for each person said to have suffered from the disease as would enable a medical man to form an opinion as to the validity of the diagnosis. Many of these pedigrees deal with a very large number of individuals; thus that of the Tenua families includes eight generations and about 400 persons. Enough has been said to show that a rich mine of material has been opened up, and we hope that it will be worked by the experts in heredity. If they desire fuller information on any point or doubt the accuracy of what is contained in this volume, the excellent bibliography will make reference to the original sources easy for them.

In an article on natural hair-balls in *The Field* of February 25, Mr. Lydekker records the fact—apparently not referred to in any book on reptiles or general natural history—that the stomachs of South American alligators (caimans) not infrequently contain large balls of hairs, derived, doubtless, from mammals which formed their prey. The evidence rests on the testimony of Mr. J. S. da Costa, who brought home a specimen—now in the Museum of the Royal College of Surgeons—and who states that, in the belief of the natives, such accumulations eventually lead to the death of the reptiles. A hair-ball composed mainly of tenrec-hair, brought to England from Madagascar by Mr. A. Dobrée, may indicate that Old World crocodiles are afflicted in the same manner, although this cannot at present be regarded as certain.

Breeders should be much interested in an article, by Mr. R. Bunsow, in the second number of the new serial *The Mendel Journal*, on the inheritance of coat-colour in thoroughbred horses. Taking up the subject from the established fact that bays (including browns) may be either pure as regards the power of transmitting their colour, or impure, when they may give rise to chestnuts, the author states that bays, as being capable of producing offspring of a colour different from their own, are a dominant type (D), while chestnuts, which lack this capacity, are recessive (R). Chestnut horses, as having but one kind of sexual cells, may accordingly all be symbolised as RR, whereas bays may be classed either as DD or DR, according to whether they are pure or whether they contain an admixture of chestnut cells. Now if a DD stallion be mated with an RR mare, all the foals will be DR bays. On the other hand, the foals of an RR mare by a DR stallion will, in the long run, consist of bays and chestnuts in nearly equal numbers. When chestnuts are bred together, their offspring should be all chestnuts (RR), but if chestnuts be crossed with bays, the foals may be either all bays or half chestnuts (RR) and half bays (DR), the former case, as mentioned above, being due to the fact that the parent bays were DD, and the latter to their being DR. Certain exceptions to these conditions occurring in the Stud-book are shown to be due to incorrect registration of colour, and it is probable that the same is the case with the rest. As regards greys, it is asserted that one of the parents must be of this colour.

A summary, by Mr. A. B. E. Hillas, of reports received relative to the movements of eel-fry during the year ending September 30, 1909, has been received from the Irish Department of Agriculture and Fisheries (Fisheries, Ireland, Sci. Invest., 1910, vi.). This summary, which is a continuation of that of the previous year, presents the substance of replies given to four questions, widely circulated among those likely to be able to give information of the movements of eel-fry in the various river systems. The information at present available is not sufficient to permit the author to state with certainty whether the successive immigrations of fry form parts of one continuous annual series or are divisible into two or more seasonal runs; the facts reported from Wexford seem to support the latter view, whereas in the Coleraine district there was a run from March to June, which was practically continuous from April 21.

A list of wild flowers recorded from Barmouth and the neighbourhood is published by Mr. James Kynoch, Brighton. The most interesting part is the list of plants, including cryptogams as well as phanerogams, compiled by the Rev. T. Salwey, and published in 1863, in which localities in the county of Merioneth outside the Barmouth district are given.

Proceeding from the appearance of a variant *Œnothera rubricalyx*, distinguished from its progenitor *Œnothera rubrinervis* by increased red coloration in parts of the plant, Dr. R. R. Gates communicates to the *American Naturalist* (April, 1910) an article in which he discusses the bearing of what is regarded as an instance of quantitative colour inheritance, concluding that in many cases the difference between Mendelian hybrids must be simply quantitative, involving a difference either in the amount of certain material substances or in the energy content of certain constituents.

Continuing his revisions of fungal species in the *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften*, Vienna (vol. cxix., part v.), Prof. F. von Höhnel discusses a number of Ascomycetes, and presents a scheme for classifying the Microthyriaceæ. To the same number Miss J. Menz contributes a paper on the morphology of the genus Allium, in which the taxonomic value of the leaf bundles is considered, and a relationship between the Allioideæ and Amaryllidoideæ is suggested, primarily owing to the development of mucilage canals and cells containing raphides.

A first contribution to the flora of Siam, published in the *Kew Bulletin* (No. 1), is jointly provided by Dr. A. F. G. Kerr, who collected the plants and has written an introductory sketch of the vegetation on Doi Sootep, a mountain in northern Siam, and by Mr. W. G. Craib, who is responsible for the identifications. Different types of forest are associated with *Pentacme siamensis, Dipterocarpus tuberculatus*, species of Quercus and Castanopsis, *Pinus Khasya*, and *Quercus Junghuhnii*. In several of the associations, epiphytes, chiefly orchids and ferns, are a characteristic feature; *Dischidia Rafflesiana, Agapetes Hosseana,* and *Rhododendron Veitchianum* are notable epiphytes. Mr. Craib's list, which is confined to the Polypetalæ, contains a number of species new to science, and a type of a new genus, Pittosporopsis, in the family Icacinaceæ. A very large preponderance of species in the family Leguminosæ is due partly to the number of genera and partly to the variety of species in the genera Desmodium, Crotalaria, Cassia, and Bauhinia.

In the *Cairo Scientific Journal* for January, Mr. W. Cartwright has an article on the control of the cotton aphis, thus adding one more to the many useful communications relating to cotton cultivation which have appeared in that journal during the past four years, during which but little has been done officially to promote research in this important field.

In a recent paper (*Bull. de l'Acad. Imp. de Sci. de St. Pétersbourg*, 1911, No. 2) Prince Galitzin discusses the records obtained at Pulkowa of the great earthquake of January 3–4. He finds that the epicentre was situated in lat. 43° 14′ N., long. 78° 24′ E., an estimate which agrees closely with that obtained from the records at Eskdalemuir of lat. 42° N., long. 77° E. Both points lie close to Lake Issyl-kul, and to the epicentral area of the great Vyernyi earthquake of June 9, 1887.

The seismological bulletins of the observatory at Zikawei for November and December, 1910, consist of registers obtained from Omori and Weichert pendulums. The former weighs about 15 kilos., and the latter about 1200. In December the heavier of these instruments gave twenty-three records, whilst the lighter only gave eighteen. Three out of the twenty-three seem to be peculiar to Zikawei, whilst the remaining twenty were also recorded in Great Britain, and probably at most stations in the world.

A popular article by a resident at Innsbruck, the capital of Tyrol, on the Föhn wind as it strikes an observer, appears in *Symons's Meteorological Magazine* for February. This blows at times with considerable force, sweeping northwards from the Brenner Valley as a warm, dry wind, raising clouds of dust in its track. If it is summer, the atmosphere becomes stiflingly hot, if winter, the keen, frosty air turns mild and close; and it sometimes exerts a depressing influence on the nervous system. From twenty-five years' observations supplied by Dr. H. v. Ficker, Innsbruck has an annual average of forty-three days of Föhn; it is most frequent in spring (seventeen days) and autumn (eleven days). It generally lasts one or two days; twice in the above period it lasted eight days. On vegetation it has its advantages, *e.g.* Innsbruck owes its crops of maize to it, and some floral types from the inter-Glacial period still survive in the Inn Valley. Its attacks are mild compared with those in certain Swiss valleys, where it sometimes uproots trees by its fury.

In the Australian Monthly Weather Report for March, 1910, Mr. H. A. Hunt gives a very interesting account of a hurricane of exceptional severity that visited the Fiji group of islands on the 24th and 25th of that month. The storm was a remarkable one, and its track can be followed for some 2500 miles from Fiji to New Caledonia, Norfolk Island, and the North Island of New Zealand, where it arrived on the morning of the 30th. The harbour master at Suva states that its approach was quite unexpected; the heat was excessive, but the barometer gave scarcely any warning. At midnight it was falling; at 2h. a.m. it stood at 29·00 in., and the easterly wind was increasing, with heavy rain. At 3h. a.m. it was blowing with hurricane force, and sheets of iron were flying from all directions between E. and N.E.; at 4h. a.m. the barometer had fallen to 28·50 in., and then began to rise. At Levuka there was a calm of about ten minutes as the votex passed over the town, with a complete change of direction, but at Suva the wind simply backed from E. to N.N.E. as the barometer rose. The isobaric charts show that the storm followed the usual track, moving in a W.S.W. direction until caught in the easterly atmospheric drift of mid-latitudes, when it curved to the south-east.

In the January number of the *American Journal of Science* appears a communication by Dr. L. A. Bauer on gravity determinations at sea, in which he discusses the results obtained by Dr. Hecker in 1901, 1904, and 1909, and indicates the direction in which efforts are being made to attain more satisfactory results during the cruise of *Carnegie,* starting from Cape Town about April, 1911. In spite of the most elaborate precautions which were taken in Hecker's trips, trouble was experienced with the boiling-point thermometers employed to determine the atmospheric pressure in order to compare it with the height of the mercurial column, which, under the same conditions, changes with variations of gravity. Experimental work with boiling-point thermometers was carried out on the *Carnegie* in 1909–10, and the results showed that it would be worth while to attempt gravity work on board of her. The methods and reductions hitherto employed are discussed, and the view is expressed that some error may attach to the results obtained by the boiling-point thermometers, and that in the method of reduction local gravity anomalies observed during a cruise partake of the nature of accidental errors. On the *Carnegie* it is proposed to make both shore and harbour observations, especially at places where pendulum observations have already been made; frequent zero determinations of the thermometers, and comparisons of the barometers with shore standards, wherever available, are to be employed to determine the various errors. The necessary refinement of the barometric work remains as the chief difficulty, and the hope is expressed that, in view of the great importance of the subject, a method superior to the present may be discovered whereby the boiling-point thermometer may be eliminated.

In an original memoir in the January number of *Le Radium*, M. G. Sagnac, of Paris, shows that in order that the time occupied by two beams of light in describing in opposite directions the contour of an area of considerable magnitude may be the same, it is necessary and sufficient if the vector which defines the relative velocity of the æther with respect to the optical system is irrotational throughout the area enclosed by the contour. In order to test whether the æther in the immediate neighbourhood of the earth possesses this property, M. Sagnac divided a beam of light into two portions, which he sent in opposite directions round a circuit consisting of a horizontal length of about 30 metres, an equal vertical length, and a third sloping one joining the two former. The two beams after traversing the circuit interfere, and the bands are observed in a telescope allowing a determination of displacement of 1/1000 of the width of a band. The plane of the circuit being east and west, observations of the bands were taken at various hours of the day and night, but no displacements were observed equivalent to a change in the relative motion of æther and matter of 1 millimetre per second for an elevation of 1 metre. Any relative motion that exists must, therefore, be practically irrotational.

THE Journal of the Franklin Institute for February contains a report on recent progress in the chemistry of the terpenes and camphors, by J. S. Hepburn. Similar reports dealing with the sugars and the proteins have appeared in the two preceding years. The present report is based upon Wallach's recently published volume on the "Terpenes and Camphor," and in the space of twenty-five pages gives an excellent summary, which is likely to be of service to those who are unable to make use of the German original.

MR. A. E. PORTER finds that a number of ferments, including pepsin, trypsin, and rennet, are rendered inactive by being kept in contact with artificial membranes, especially with collodion ones. Most ferments which have thus been inactivated have at the same time acquired inhibitive properties. The inactivation of ferments by membranes is not due to simple absorption, for there is no evidence of saturation of the membrane; on the contrary, its inactivating power appears to improve with repeated use. Although the inhibitive power of the inactivated ferments may be due in part to substances preformed in the solution, inhibition is still present after removal of these substances, suggesting that the ferment itself is changed by contact with a membrane into a substance having an inhibiting power on itself (*Quart. Journ. Experiment. Physiol.*, iii., No. 4, December, 1910, p. 375).

THE important discoveries of MM. Paul Sabatier and Senderens on the catalytic action of finely divided metals, notably nickel and copper, have recently been extended to a study of the catalytic action of various metallic oxides. In the current number of the *Comptes rendus* MM. Paul Sabatier and A. Mailhe give an account of a new synthetic method, based on the catalytic effect of titanium oxide, which would appear to possess many practical applications. They show that if a column of titanium dioxide is maintained at a temperature of 280°–300° C., and a mixture of the vapours of a primary alcohol and a fatty acid (other than formic acid) is led over it, the corresponding ester is formed. The same limit is here reached instantaneously as was found by Berthelot after prolonged contact. An excess of either constituent favours the limit of combination of the other. Following this method, the methyl, ethyl, propyl, butyl, isobutyl, and isoamyl esters of acetic, propionic, butyric, isobutyric, isovaleric, and caproic acids have been prepared. Esters of benzyl alcohol have also been readily obtained by this method. The inverse action—the direct hydrolysis of esters by water—is also easily effected, and the use of titanium dioxide reduces any secondary reactions to a negligible amount.

AN article on ferro-concrete beams with single reinforcement appears in *Engineering* for March 3, from the pen of Dr. W. C. Unwin. The object of the article is to put the equations of the ordinary theory into the most convenient form for calculation. The ordinary theory is known to be only roughly approximate, but the assumptions made are believed to be generally on the side of safety. The formulæ, however, are still in some cases very complicated, as given in books, due to the attempt to obtain formal exactness from a mathematical point of view. But the data used in solving problems are themselves only approximate; for instance, the selected value of the coefficient of elasticity of concrete, which itself varies with the stress, and the neglect of the tensile stress in the concrete. Hence it would appear that, for practical purposes, a sacrifice of mathematical exactness in the form of the equations is justifiable, if the errors are small within a practical range. In fact, some of the equations are only used in designing by making assumptions and proceeding by trial and error, or by the use of tables and curves based more or less on experience. Both rectangular and **T** sections are dealt with in the article, and examples are given of the use in practice of the simplified formulæ deduced.

A COPY has been received of the first number of the *Irish Review*, a monthly magazine of Irish literature, art, and science. Science is represented only by an article on economics by Mr. George W. Moore, in which he deals with the problem of rural life. The magazine is published in Dublin, and may be obtained in London from Messrs. Simpkin, Marshall, Hamilton, Kent and Co. The price is 6*d*. net.

THE annual report for 1910 of the Philosophical Institute of Canterbury, New Zealand, shows that the condition of the institute continues to be satisfactory both as regards the number of members and the active interest displayed in those branches of science which constitute its object. The special lines of research outlined in last year's report have been developed, and some have already given good results. These lines of inquiry are:—observations on the Arthur's Pass tunnel; a survey of the Canterbury lakes; and an examination of the Christchurch artesian system. This is quite apart from the original work which has been carried on by individual members of the institute. A subcommittee has also been considering the question of the more adequate protection of the native fauna. Ten meetings of the institute were held during the year, at which the average attendance was sixty-four. At these meetings twenty-seven papers embodying the results of original research were read. These are classified as follows:—botany, four; zoology, seven; geology, five; chemistry, six; physics, two; mathematics, one; miscellaneous, two.

OUR ASTRONOMICAL COLUMN.

THE BRILLIANT METEOR OF FEBRUARY 19.—Mr. W. F. Denning writes:—"A very good observation of this object comes from Mr. Felix de Roy, of Antwerp, who describes the apparent path as from 27°+34° to 11°+60°, and onwards to the north-east. He gives the duration as twelve seconds, but this only relates to a portion of the flight. To him the meteor disappeared in a cloud.

"At Putney the object was seen by Mr. F. E. Baxandall, who gives the duration as fifteen seconds, but I do not know whether the newspaper account of his observations includes the course of the meteor. The radiant point appears to have been at 46°−15° in Eridanus, and the heights 70 to 49 miles along a path 590 miles long, and probably this does not include the whole extent of the visible luminous trajectory. Its motion seems to have passed from over the English Channel between Brest and Plymouth to Oldenburg, in Hanover. From Stowmarket the meteor was seen to rise from the south-west horizon, and at Antwerp it was low in the north-east when it disappeared. The meteor may therefore have sailed along in a nearly horizontal flight much further, but it was rising, not falling, to the earth when last seen.

"This meteor, though of such an extended course, is not beyond precedent, for according to the computations of the late Prof. Herschel the fireball of August 18, 1783, had a path of 1000 to 1200 miles; that of September 5, 1868, was watched along 880 miles; while that of July 20, 1860, was traced more than 1000 miles. It will be important to secure observations of the meteor of February 19 from Cornwall or the north-west coast of France, and from Holland and Hanover or that region."

HALLEY'S COMET.—Dr. Ebell publishes a bi-daily ephemeris for Halley's comet, extending to April 30, in No. 4476 of the *Astronomische Nachrichten*. Although the comet is not likely to be observed with ordinary instru-